One hundred seven species of plants and 39 animal species characterized the summer-fall aspect of shrub uplands. Structural diversity is low but species richness is high. Cutover pine-hardwood sites studied in central Louisiana have higher quality deer forage than forested sites (Thill, 1983; Thill et al., 1990). However, shrub cover is lacking as habitat for wildlife that require older vegetation and a stratified overstory Shrub-dominated terraces and uplands were given a WHV=5 and EQR=4. This type is second only to grasslands in forage production. Relatively high proportions of forbs and browse on shrub terraces and uplands make them more valuable range for deer than cattle. Deer feed primarily on forbs and woody plants and cattle feed primarily on grasses. For deer, the type provides protective cover.

Sub-merchantable age pine plantations observed range from 3-15 years old; most were IO-15 years old. Stands of this age have trees 15-20 ft. tall. The tree foliage closure is 3-91% with a mean of 64%. Mixes of grasses, forbs, and woody plants cover up to 9 1% of the ground layer with a mean coverage of 54%. Some younger plantations have a dense rough of native plants that provided cover and food for ground dwelling wildlife. Deer use the plantations for rest, escape, and foraging. The habitat value of sub-merchantable age plantations declines as the trees grow older and shade the ground vegetation (Figure 27). When harvesting of timber begins, forage quantity for wildlife increases concomitantly with opening of the stands Plantations observed are poor to fair wildlife habitat (WHV = 2; EQR = 7).

Grasslands

Hay fields, pastures, and old fields are the grasslands observed. Cumulatively, grasslands cover about 25% of the reconnaissance area. Hay fields are the largest grassland sub-type and occur in the largest units, i.e., up to several hundred acres or more (Figure 33). Reconstituted lignite mine sites planted to non-native grasses (Figure 34), and turf farms were included in this type.

The variety of plants is slightly greater on pastures than hay fields. Wildlife make greater use of pasture and hay field edges where the protective cover of woodlands is nearby. Ecologically, these two

Figure 33. Large irrigated hayfield Camp County, TX.

Figure 34. Lignite mining, Titus County, TX Originally pine-hardwood upland forest, this land is heing reconstituted and planted in non-native grasses

sub-types are poorest of the eight vegetated cover types compared (WHY = 1; EQR = 8). Large homogeneous grasslands strongly influenced the low ranking.

Old fields are significantly different ($P < 0.05$) in plant and animal composition than pastures and hay fields. Those observed are relatively small acreages. They appeared to be long abandoned cropland and pastures reclaimed naturally by assemblages of native and introduced herbs. Woody plants are encroaching on some fields (Figure 35). While old fields lack vertical plant diversity, they are more diverse than other grasslands (Figure 36). Their occurrence as relatively small units of cover Interspersed within different cover types make old fields significantly more valuable to wildlife than the other grasslands (WHV = 6; EQR = 5)

Figure 35. Old field on pine-hardwood upland, Cass County, TX. Note the encroachment of pine seedlings.

Some old fields are remnant stands of native grasses that occurred historically. Conservation measures might include the protection and management of select fields as museums of the Watershed's floral history. Management would require controlled burns as needed to maintain the historical plant succession (see **Ecological Considerations and Land Use).**

Cropland

Approximately two percent of the Watershed is cropland. Observations on this type included watermelon and pea fields, Christmas tree farms, peach orchards, and pecan orchards. Other crops that are planted in the basin were not encountered. An insufficient number of observations were made on the various crops to assign WHV and EQR rankings. Crop land observed was judged poor to fair, ecologically. Orchards have the greatest amount of wildlife use; mainly by species of birds.

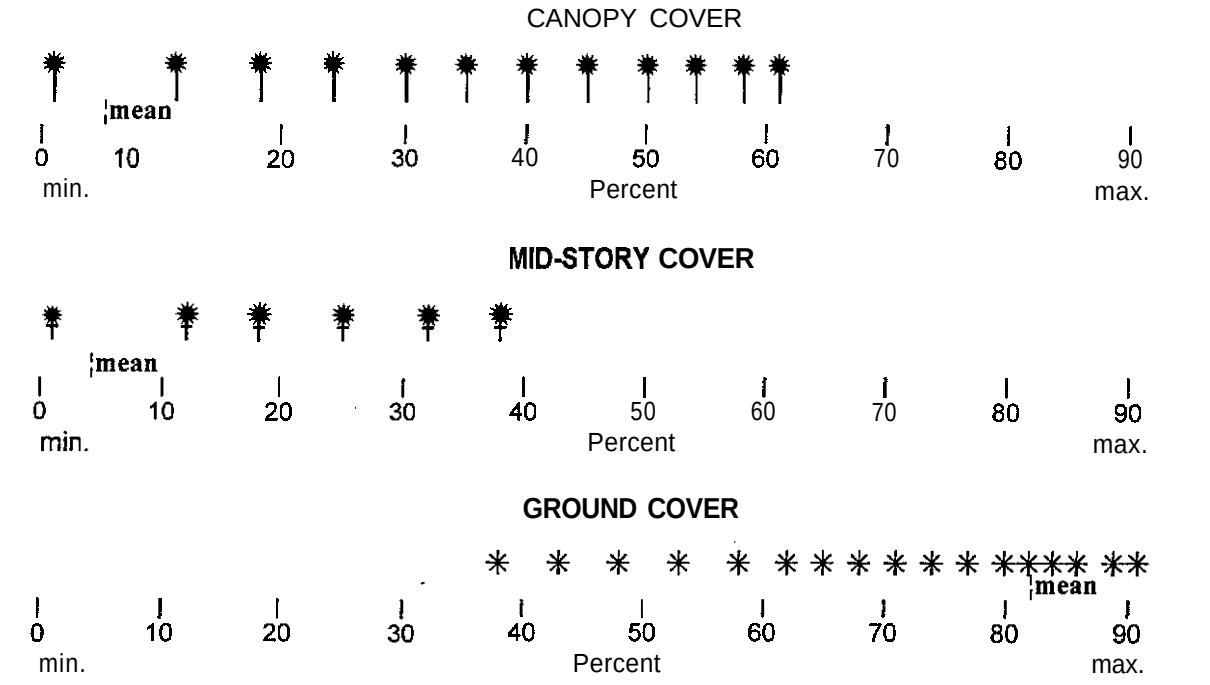

Figure 36. Percent vegetation cover on old fields observed June - October 1994, Big Cypress Bayou Watershed.

--we abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect ---

Aldo Leopold

Developed and Disturbed Land

Urban, suburban. and industrial sites. About 25,600 ac. of the reconnaissance area are in community and industrial developments. Few observations were made on developments. Their ecological role needs more evaluation. Subjective assessments on parks and suburban residential-recreation developments revealed good plant structural diversity and species richness. A high number of wildlife species, primarily birds, were seen in some subdivisions (Appendix F). As native habitat succumbs to development, and wildlife exposure to development increases, many adaptable species are "coming to town". Many non-adaptable species are declining. Developments such as college campuses, wooded estates, and suburban country clubs appear to be attracting a growing number of wildlife (Figure 37). Examples are American crow, mourning dove, Inca dove, bobwhite, gray squirrel, fox squirrel, cottontail, and deer. Odum (197 l) wrote that the density of song birds is greater on campuses and estates than on uniform forests and grasslands (e.g., large pine monocultures and homogenous grasslands). Reconnaissance observations support Odum's statement. Compared to natural systems, heavily developed municipalities and industrial sites attract more "weed species", e.g., house sparrow, European starling, brown-headed cowbird, rock dove (common pigeon), Norway rat, roof rat, and house mouse.

Bare wound. An estimated 25,600 ac. within the reconnaissance area are devoid of vegetation. Lignite and iron ore mines, other large sites with exposed soil, and surfaced roads were classed as bare ground. Lignite sites have both bare ground and reconstituted areas planted to grasses (Figure 34). Iron ore sites range from active mines to inactive sites of various sizes and ages. There is substantial cover variation. The amount of cover and signs of wildlife are concomitant with site age. Old abandoned mines usually have more cover, but few sites have more than sparse vegetation. Particularly, large devegetated sites are poor wildlife habitat and are very poor ecologically (Figure 38). Because of the low number of observations on mines, WHV and EQR indices could not be calculated.

Figure 37. Golf course near Longview, TX. A type of urban-suburban area used by a variety of wildlife.

Figure 38. Large iron **ore mine** site. Morris County, TX